

# PATENT SPECIFICATION

NO DRAWINGS

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## COMPLETE SPECIFICATION

### Fermented Milk

- I, SEIJI KUWABARA, a Japanese subject of Room No. 731 Broadway Building, No. 52-15, 5-chome, Nakano, Nakano-ku, Tokyo, Japan, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- This invention relates to a process for the production of a fermented milk and its product similar to yoghurt, which contains active lactic acid bacteria.
- It is an object of this invention to improve the process for the production of a fermented milk of pleasant flavor containing active lactic acid bacteria.
- It is a further object of this invention to produce a fermented milk similar to yoghurt which is more delicious and nutritious and contains more viable cells of lactic acid bacteria than ordinary yoghurt.
- Further objects and advantages of the invention will be apparent from the following detailed explanation.
- It is conventionally known to produce a fermented milk in which whole milk or skim milk combined with sugar and aromatics is fermented with lactic acid bacteria.
- The flavor of such a known product results from fermentation with lactic acid bacteria and artificial aromatics added thereto.
- When yeasts are used for the production of fermented milk to produce aromatic substances, the formation of a complete curd in the milk is likely to be an obstacle due to the generation of carbonic gas from alcoholic fermentation.
- Furthermore, yeasts cause, in some cases, alcoholic fermentation by taking as their fermentative substrate the lactose in milk and produce alcohol in the milk, and the sterilization of yeast in milk with heat causes a separation of alcohol-denaturated milk protein from whey in the milk, thus the fermentation with lactic acid bacteria is unsatisfactory because of the less amount of lactic acid bacteria growth in the said milk.
- In order to prevent the separation of alcohol-denaturated milk protein from whey in the milk, for the production of a fermented milk similar to yoghurt many complex processes required; for example, a process for controlling the alcohol concentration in the milk.
- The inventor has made studies on a method of the production of a yoghurt-like fermented milk containing active lactic acid bacteria, which has a pleasant odor attributive to fermented milk products and which is more delicious, nutritious and can be stored longer than yoghurt.
- Thus, the inventor has found that there is no separation of milk protein from whey in the milk after the sterilization of yeast in the milk, when a yeast which grows adequately in the milk by assimilating lactose but produces aromatic substances and only a small amount of alcohol is cultivated in the milk.
- Moreover, the inventor has found that fermentation of the milk with lactic acid bacteria after heat-sterilization of the yeast is more satisfactory, the fermented milk thus produced possesses a finer flavor, better taste and better consistency than that obtained by cultivating yeast having the ability to ferment lactose in whole milk or skim milk followed by fermentation with lactic acid bacteria, the yeast being one which can assimilate lactose and produce aromatic substances without causing alcoholic fermentation in the whole milk or skim milk.
- This invention is based upon the above findings and relates to a process for the production of a yoghurt-like fermented milk containing active lactic acid bacteria which comprises culturing, in whole milk or skim milk, a yeast capable of producing aromatic substances but scarcely causing alcoholic fermentation.

[Price : p)]

5 tation in whole milk or skim milk, sterilizing the yeast in the whole milk or skim milk, cooling the sterilized milk, innoculating said milk with lactic acid bacteria, and fermenting said milk, and if desired, mixing the fermented milk thus produced with a suitable additive.

10 A process for the production of the fermented milk in accordance with this invention comprises the two steps as described above, namely, the first step being culturing the above-mentioned yeast in whole milk or skim milk and the second step being culturing lactic acid bacteria, after sterilization of the yeast in the milk.

15 In the first step, the yeast is cultivated in whole milk or skim milk. It is possible in some cases to add 2 or 3% sucrose to the whole milk or skim milk.

20 The yeast to be preferably used in this invention is one selected from the yeast belonging to the genus *Kloeckera*, or to the species *Hanseniaspora Lindneri*, *Brittanomyces bruxellensis*, *Zygosaccharomyces Sake*. As a preferable yeast belonging to the genus *Kloeckera* there may be mentioned, for instance, *Kloeckera africana* Janke and *Kloeckera apiculata*.

30 After culturing the yeast in the whole milk or skim milk 15 or 20 hours at 25 or 30 degrees centigrade, the milk thus obtained is sterilized with heat, for instance, at 100 degrees centigrade for 30 minutes, then the sterilized milk is cooled with water or air to the suitable temperature, for instance, about 35 30 degrees centigrade, inoculated with the lactic acid bacteria and incubated at from 25 to 35 degrees centigrade until its acidity reaches from 0.8 to 1.0%.

40 As the lactic acid bacteria, for example, *Lactobacillus acidophilus*, *Lactobacillus bulgaricus*, *Lactobacillus casei*, *Streptococcus thermophilus*, *Streptococcus lactis* or *Streptococcus diacetylactis* is preferably used for the purpose. In this invention, one or more lactic acid bacteria may be used; and especially the most satisfactory result is obtained when one of *Lactobacillus acidophilus* and *Lactobacillus casei* is used with one of *Streptococcus thermophilus* and *Streptococcus lactis*.

50 According to the invention, no separation of milk protein from whey after sterilizing the yeast cultivated in whole milk or skim milk occurs.

55 Furthermore, very little generation of carbonic gas by alcoholic fermentation occurs, since the yeast scarcely causes alcohol fermentation in whole milk or skim milk.

60 According to the invention, the fermentation with lactic acid bacteria, is more satisfactory and the fermented milk thus produced possesses a finer flavor and better taste and better consistency as compared with the product produced by fermenting the milk with lactic acid bacteria alone.

Such particularities as above are due to the co-operation of the above-mentioned yeast and lactic acid bacteria.

70 The fermented milk thus produced may if desired be mixed with suitable additives according to taste.

As such additives, tea or fruits may preferably be used. Fruit extract, coffee extract, tea powder or tea extract, green tea powder or green tea extract may be also used as the additives.

Moreover these additives may be used in the form of a syrup and it is advantageous to use a germ-free syrup in this connection.

80 The mixture of the fermented milk and the syrup may be homogenized under a pressure of 30 to 100 kg/cm<sup>2</sup>.

85 The product in accordance with this invention is similar to yoghurt. The product of the invention is very good fermented milk viewed from such points as flavor, taste, consistency, and nutrition, etc. The better product having delicious flavor, better taste and better consistency is obtained by using one of *Lactobacillus acidophilus* and *Lactobacillus casei* with *Streptococcus thermophilus* or *Streptococcus lactis* as the lactic acid bacteria.

95 The following non-limitative examples illustrate the process according to the invention.

#### EXAMPLE 1

100 10 g. of milk-culture in which *Kloeckera africana* Janke or *Kloeckera apiculata* have been cultivated is added to 1 kg. of skim milk or whole milk and then the milk medium is incubated at 25 to 30 degrees centigrade for 15 to 20 hours.

105 After 15 to 20 hours, the obtained milk in which the yeast have been grown is sterilized with heat at 100 degrees centigrade for 30 minutes and after cooling the sterilized milk with water, the obtained milk inoculated with 1 g. of *Lactobacillus acidophilus* culture and 1 g. of *Streptococcus lactis* culture, and incubated at 25—35 degrees centigrade for 17—25 hours until its acidity has reached to 0.8—1.0% in the obtained milk.

110 The fermented milk thus obtained and the green tea syrup produced by mixing sugar, green tea powder and water at the ratio of 27:1:12, are mixed.

115 The mixture is homogenized in a homogenizer and the final fermented milk product is stored in a refrigerator.

#### EXAMPLE 2

120 10 g. of milk culture in which *Hanseniaspora Lindneri* have been cultivated is added to 1 kg. of skim milk or whole milk and then the milk medium is incubated at 25 to 30 degrees centigrade for 15 to 20 hours.

125 After 15 to 20 hours, the obtained milk in which the yeast have been grown is sterilized with heat at 100 degrees centigrade for

- 30 minutes, after cooling the sterilized milk with water, the milk is inoculated with 1 g. of *Lactobacillus casei* culture and 1 g. of *Streptococcus thermophilus* culture and incubated at 25 to 35 degrees centigrade for 17 to 25 hours until its acidity has reached to 0.8—1.0% in the obtained milk.

The fermented milk thus obtained and orange syrup are mixed.

- 10 The mixture is homogenized in a homogenizer and the final fermented milk product is stored in a refrigerator.

### EXAMPLE 3

- 15 The fermented milk product is produced as in Example 2 except that *Brettanomyces bruxellensis* or *Zygosaccharomyces Sake* is used in lieu of *Hanseniaspora Lindneri*.

### WHAT I CLAIM IS:—

- 20 1. A process for the production of a yoghurt-like fermented milk containing active lactic acid bacteria, which comprises culturing, in whole milk or skim milk, a yeast capable of producing aromatic substances but scarcely causing alcohol fermentation in whole milk or skim milk, sterilizing the yeast in the whole milk or skim milk, cooling the sterilized milk, inoculating said milk with lactic acid bacteria and fermenting said milk, and if desired, mixing the fermented milk thus produced with a suitable additives.

- 30 2. A process according to claim 1, in which the yeast to be used is one selected from the yeast belonging to the genus *Kloeckera*, or to the species *Hanseniaspora Lindneri*, *Brettanomyces bruxellensis* or *Zygosaccharomyces Sake*.

- 35 3. A process according to claim 2, in which the yeast belonging to the genus *Kloeckera*

is *Kloeckera africana* Janke or *Kloeckera apiculata*.

- 40 4. A process according to any one of the preceding claims, in which as lactic acid bacteria, *Lactobacillus acidophilus*, *Lactobacillus casei*, *Streptococcus thermophilus*, *Streptococcus lactis*, *Lactobacillus bulgaricus* or *Streptococcus diacetylactis* is used to ferment the sterilized milk.

- 50 5. A process according to claim 4, in which one of *Lactobacillus acidophilus* and *Lactobacillus casei* is used with one of *Streptococcus thermophilus* and *Streptococcus lactis* to ferment the sterilized milk.

6. A process according to any one of the preceding claims, in which the additive is coffee extract, tea-powder or extract, green-tea extract or green tea powder.

7. A process according to any one of the preceding claims, in which the additive is in the form of a syrup.

8. A process according to claim 7, in which the sugar syrup is germ free.

9. A process according to any one of claims 7 or 8, in which the mixture of the fermented milk and the syrup is homogenized under a pressure of 30 to 100 kg/cm<sup>2</sup>.

10. A process of producing yoghurt-like fermented milk substantially as hereinbefore described with reference to the examples.

11. A yoghurt-like fermented milk whenever obtained by the process claimed in any of the preceding claims.

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